

Aardgas - Bepaling van het watergehalte bij hoge druk (ISO 11541:1997)

Natural gas - Determination of water content at high pressure (ISO 11541:1997)

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ICS 75.060

Als Nederlandse norm is aanvaard:

- ISO 11541:1997

Preview

Normcommissie 349 193 "Aardgas"

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Voorbeeld
Preview

INTERNATIONAL
STANDARD

ISO
11541

First edition
1997-02-15

**Natural gas — Determination of water
content at high pressure**

Gaz naturel — Dosage de l'eau à haute pression

Preview



Reference number
ISO 11541:1997(E)

ISO 11541:1997(E)

Foreword

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Draft International Standards adopted by the technical committees are circulated to the member bodies for voting. Publication as an International Standard requires approval by at least 75 % of the member bodies casting a vote.

International Standard ISO 11541 was prepared by Technical Committee ISO/TC 193, *Natural gas*, Subcommittee SC 1, *Analysis of natural gas*.

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Natural gas — Determination of water content at high pressure

1 Scope

Water vapour may be present in natural gas due to, for example, natural occurrence in the well production stream, the storage of gas in underground reservoirs, transmission or distribution through mains containing moisture or other reasons.

This International Standard specifies a method of determining the water content of natural gas under pressures of more than 1 MPa, the upper pressure limit being determined by the maximum pressure that the apparatus can withstand. It is applicable to sweet natural gas and sour natural gas, containing hydrogen sulfide, with a water concentration of 10 mg/m³ or more.¹⁾

NOTE — Test data may be affected by alcohols, mercaptans, hydrogen sulfide and glycol contained in the sample gas, as these compounds react with the phosphorus pentoxide (P₂O₅) used to absorb the water vapour in the gas.

2 Normative reference

The following standard contains provisions which, through reference in this text, constitute provisions of this International Standard. At the time of publication, the edition indicated was valid. All standards are subject to revision, and parties to agreements based on this International Standard are encouraged to investigate the possibility of applying the most recent edition of the standard indicated below. Members of IEC and ISO maintain registers of currently valid International Standards.

ISO 10715:—²⁾, *Natural gas — Sampling guidelines*.

3 Principle

A measured volume of gas is passed through an absorption tube filled with phosphorus pentoxide. Water contained in the gas is absorbed by the phosphorus pentoxide and phosphoric acid is formed. The increase in the mass of the tube is deemed to be the mass of water present in the gas. The absorption of water vapour at pipeline pressure is favoured over absorption at ambient pressure for the following reasons:

- a) the water vapour partial pressure is high;
- b) the necessary amount of gas is transmitted in a shorter time.

1 In this International Standard, all volumes are expressed at 288,15 K and 101,325 kPa.

2) To be published.

4 Reagents and materials

4.1 Granulated phosphorus pentoxide, on a solid support with a moisture indicator (commercially available).

WARNING — Observe all safety precautions for phosphorus pentoxide. Any contact with skin or eyes and inhalation of vapours shall be avoided. Appropriate protective clothing shall be worn while working with phosphorus pentoxide.

4.2 Silica wool.

WARNING — If not handled properly, silica wool can cause silicosis. A respirator is recommended for safe handling.

5 Apparatus

5.1 The test apparatus consists of the following components (see figures 1, 2 and 3):

5.1.1 Pressure vessel body.

5.1.2 End piece for pressure vessel.

5.1.3 Filter tube, made of glass, with an outside diameter of 20 mm and a length of 32 mm, filled with silica wool.

5.1.4 Coupling between filter tube and absorption tube, made of stainless steel.

5.1.5 Absorption tube, made of glass, with an outside diameter of 20 mm and a length of 140 mm.

5.1.6 End piece for absorption tube, made of stainless steel.

5.1.7 Plugs for absorption tube, made of stainless steel or acrylic plastic.

5.1.8 Needle valve, designed as a shut-off valve which will produce a slow pressure increase in the absorption tube, with a transfer line linking it to the sample probe and connector linking it to the pressure vessel inlet.

5.1.9 Pressure vessel, capable of accommodating the filter tube and the absorption tube.

WARNING — The pressure vessel shall be designed and have been tested for the pressure for which it will be used. Appropriate national safety regulations for pressure vessels and other equipment shall be observed.

5.1.10 Connector, for the pressure vessel outlet.

5.1.11 Manometer, for the appropriate pressure range.

5.1.12 Outlet needle valve, for venting, made of stainless steel.

5.1.13 Gas flow meter, for a maximum flow rate of 10 m³/h.

5.1.14 Thermometer, incorporated in the flow meter outlet.

5.1.15 Barometer.

5.1.16 Vent line.

5.1.17 Heater.

5.1.18 Sample probe valve.

5.1.19 Manifold.

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